IN THE CLAIMS

1. (Original) A spiral accumulator apparatus for controlling the flow of articles, comprising:

a support structure;

an infeed conveyor mounted to the support structure and driven in a first direction to convey articles therealong in the first direction along a first path that is at least partially curved;

an outfeed conveyor mounted to the support structure and driven in an opposite direction to convey articles therealong in the opposite direction along a second path that is at least partially curved;

the infeed and outfeed conveyors being spaced apart and generally parallel along at least a portion of the first and second paths so as to define a space therebetween;

a track mounted to the support structure along at least a portion of the space;

a movable transport member disposed generally across and movable along the space on the track;

an article transfer member carried by the transport member and operably disposed between the infeed and outfeed conveyors to transfer articles between the infeed conveyor and the outfeed conveyor;

a transport member mover connected to the transport member, the transport member mover including and endless loop; and

a differential drive mechanism located at a fixed position spaced from the transport member, the differential drive mechanism including an output portion for contacting and moving the transport member mover when a relative speed difference exists between the infeed and outfeed conveyors thereby causing the transport member to travel in the direction of the faster of the infeed and outfeed conveyors.

2. (Original) The apparatus of claim 1, wherein the endless loop is a belt.

3. (Original) The apparatus of claim 1, wherein the endless loop is a cable.

4. (Original) The apparatus of claim 1, wherein the differential drive mechanism includes a plurality of gears.

5. (Original) The apparatus of claim 4, wherein the plurality of gears includes two input gears and a differential gear, one of the input gears being attached to an axle rotating at a speed related to that of the infeed conveyor and the other of the input gears being attached to an axle rotating at a speed related to that of the outfeed conveyor, the differential gear being driven by the two input gears so as to drive the output portion of the differential drive mechanism.

6. (Original) The apparatus of claim 1, wherein the differential drive mechanism is operatively interconnected with axles driven by the infeed and outfeed conveyors.

7. (Original) The apparatus of claim 1, wherein the differential drive mechanism includes condition responsive devices for detecting directly or indirectly a speed of the infeed and outfeed conveyors, a motor, and a drive control for driving the motor based on the speeds of the infeed and outfeed conveyors so as to move the output portion of the differential drive mechanism at a desired speed.

8. (Original) The apparatus of claim 1, further including guide members mounted to the support structure for guiding the transport member mover.

9. (Original) The apparatus of claim 8, wherein the guide members include one of pulleys or idler rollers.

10. (Original) The apparatus of claim 1, wherein the differential drive mechanism drives the transport member mover at a speed equal to half the difference between the speeds of the infeed and outfeed conveyors.

11. (Original) The apparatus of claim 1, wherein the differential drive mechanism drives the transport member mover at a speed proportional to $as_1 - bs_2$, where s_1 is the speed of the infeed conveyor and s_2 is the speed of the outfeed conveyor, and a and b are adjustable parameters.

12. (Original) A spiral accumulator apparatus for controlling the flow of articles, comprising:

an infeed conveyor driven in a first direction to convey articles therealong in the first direction along a first path that is at least partially curved;

an outfeed conveyor driven in an opposite direction to convey articles therealong in the opposite direction along a second path that is at least partially curved;

the infeed and outfeed conveyors being spaced apart and generally parallel along at least a portion of the first and second paths so as to define a space therebetween;

a movable transport member disposed generally across and movable along the space;

an article transfer member carried by the transport member and operably disposed between the infeed and outfeed conveyors to transfer articles between the infeed conveyor and the outfeed conveyor;

a transport member mover connected to the transport member; and

a differential drive mechanism located at a fixed position spaced from the transport member, the differential drive mechanism including an output portion for contacting and moving the transport member mover when a relative speed difference exists between the infeed and outfeed conveyors thereby causing the transport member to travel in the direction of the faster of the infeed and outfeed conveyors.

13. (Original) The apparatus of claim 12, wherein the transport member mover is an endless loop.

14. (Original) The apparatus of claim 13, wherein the endless loop is a belt.

15. (Original) The apparatus of claim 13, wherein the endless loop is a cable.

16. (Original) The apparatus of claim 12, wherein the differential drive mechanism includes a plurality of gears.

17. (Original) The apparatus of claim 16, wherein the plurality of gears includes two input gears and a differential gear, one of the input gears being attached to an axle rotating at a speed related to that of the infeed conveyor and the other of the input gears being attached to an axle rotating at a speed related to that of the outfeed conveyor, the differential gear being driven by the two input gears so as to drive the output portion of the differential drive mechanism.

18. (Original) The apparatus of claim 12, wherein the differential drive mechanism is operatively interconnected with axles driven by the infeed and outfeed conveyors.

19. (Original) The apparatus of claim 12, wherein the differential drive mechanism includes condition responsive devices for detecting directly or indirectly a speed of the infeed and outfeed conveyors, a motor, and a drive control for driving the motor based on the speeds of the infeed and outfeed conveyors so as to move the output portion of the differential drive mechanism at a desired speed.

20. (Original) The apparatus of claim 12, further including a support structure, the infeed and outfeed conveyors being mounted to the support structure, and further including a track mounted to the support structure and located at least partially in the space between the infeed and outfeed conveyors, the transport member being movable along the track.

21. (Original) The apparatus of claim 20, further including guide members mounted to the support structure for guiding the transport member mover.

22. (Original) The apparatus of claim 20, wherein the guide members include one of pulleys or idler rollers.

23. (Original) The apparatus of claim 12, wherein the differential drive mechanism drives the transport member mover at a speed equal to half the difference between the speeds of the infeed and outfeed conveyors.

24. (Original) The apparatus of claim 12, wherein the differential drive mechanism drives the transport member mover at a speed proportional to $as_1 - bs_2$,

where s_1 is the speed of the infeed conveyor and s_2 is the speed of the outfeed conveyor, and a and b are adjustable parameters.

25. (Original) A spiral accumulator apparatus for controlling the flow of articles, comprising:

an infeed conveyor driven in a first direction to convey articles therealong in the first direction along a first path that is at least partially curved;

an outfeed conveyor driven in an opposite direction to convey articles therealong in the opposite direction along a second path that is at least partially curved;

the infeed and outfeed conveyors being spaced apart and generally parallel along at least a portion of the first and second paths so as to define a space therebetween;

a movable transport member disposed generally across and movable along the space;

an article transfer member carried by the transport member and operably disposed between the infeed and outfeed conveyors to transfer articles between the infeed conveyor and the outfeed conveyor;

a transport member mover connected to the transport member; and

a differential drive mechanism located at a fixed position spaced from the transport member, wherein the differential drive mechanism includes two input gears and a differential gear, one of the input gears being attached to an axle rotating at a speed related to that of the infeed conveyor and the other of the input gears being attached to an axle rotating at a speed related to that of the outfeed conveyor, the differential gear being driven by the two input gears so as to drive an output portion of

the differential drive mechanism, the output portion contacting and moving the transport member mover when a relative speed difference exists between the infeed and outfeed conveyors thereby causing the transport member to travel in the direction of the faster of the infeed and outfeed conveyors.

26. (Original) The apparatus of claim 25, wherein the transport member mover is an endless loop.

27. (Original) The apparatus of claim 26, wherein the endless loop is a belt.

28. (Original) The apparatus of claim 26, wherein the endless loop is a cable.

29. (Original) The apparatus of claim 25, further including a support structure, the infeed and outfeed conveyors being mounted to the support structure, the track being mounted to the support structure and located at least partially in the space between the infeed and outfeed conveyors.

30. (Original) The apparatus of claim 29, further including guide members mounted to the support structure for guiding the transport member mover.

31. (Original) The apparatus of claim 29, wherein the guide members include one of pulleys or idler rollers.

32. (Original) The apparatus of claim 25, wherein the differential drive mechanism drives the transport member mover at a speed equal to half the difference between the speeds of the infeed and outfeed conveyors.

33. (Original) The apparatus of claim 25, wherein the differential drive mechanism drives the transport member mover at a speed proportional to $as_1 - bs_2$, where s_1 is the speed of the infeed conveyor and s_2 is the speed of the outfeed conveyor, and a and b are adjustable parameters.

34. (New) The apparatus of claim 1, wherein the infeed and outfeed conveyors are configured to convey the articles in a first in, first out sequence.

35. (New) The apparatus of claim 34, wherein the infeed and outfeed conveyors are configured to convey the articles in a single file orientation.

36. (New) The apparatus of claim 34, wherein the infeed and outfeed conveyors are configured to convey the articles in a greater than single file orientation.

37. (New) The apparatus of claim 12, wherein the infeed and outfeed conveyors are configured to convey the articles in a first in, first out sequence.

38. (New) The apparatus of claim 37, wherein the infeed and outfeed conveyors are configured to convey the articles in a single file orientation.

39. (New) The apparatus of claim 37, wherein the infeed and outfeed conveyors are configured to convey the articles in a greater than single file orientation.

40. (New) The apparatus of claim 25, wherein the infeed and outfeed conveyors are configured to convey the articles in a first in, first out sequence.

41. (New) The apparatus of claim 40, wherein the infeed and outfeed conveyors are configured to convey the articles in a single file orientation.

42. (New) The apparatus of claim 40, wherein the infeed and outfeed conveyors are configured to convey the articles in a greater than single file orientation.